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ABSTRACT

This guide, prepared to assist students who have postural and other remedial defects, is divided into four sections. Section one outlines the organization and administration of a remedial physical education program and gives information concerning the administration of alignment tests and corrections. Section two discusses anteroposterior deviations of the cervical region and illustrates 11 basic corrective exercises. Section three describes deviations of the dorsal and lumbar regions of the spine and gives some common causes for these defects. Thirteen corrective exercises are illustrated. Section four discusses the deviations of the legs and feet and illustrates 10 exercises. Eight points to remember are presented. A glossary of related terms and a two-page bibliography are included. (PD)

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CORRECTIVE PHYSICAL EDUCATION

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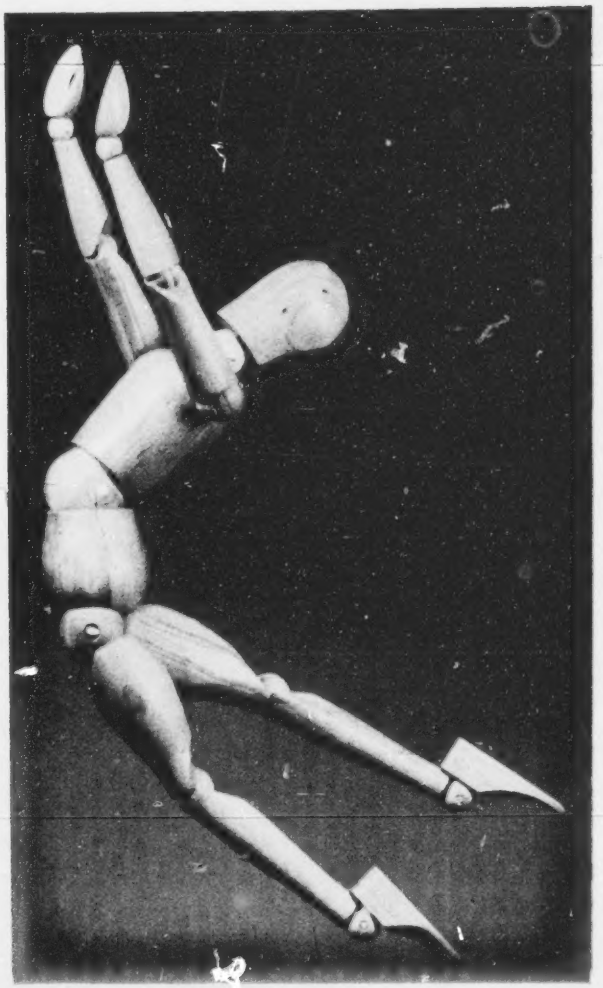

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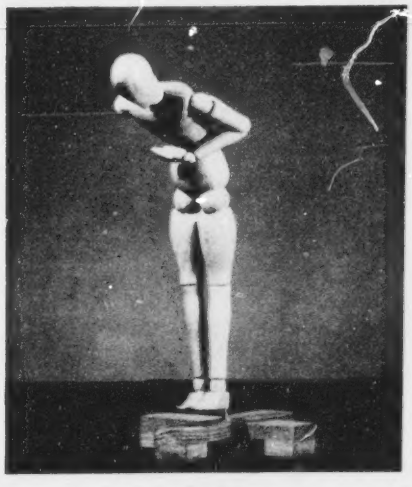

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Director, The Alfred I duPont Institute

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Miss Eleanor J. Bader
Executive Director, Delaware Curative Workshop

Miss Josephine Christaldi
Supervisor, Remedial Physical Education
Public Schools of Philadelphia

Mr. William Braverman
Department Chairman
Overbrook Senior High School
Philadelphia, Pennsylvania

Mr. Joseph Jurrick
Supervisor, Remedial Physical Education
Abington Township Public Schools
Abington, Pennsylvania

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(**Please Note:** The original (1963) edition of the guide was developed under the direction of Dr. John H. Jenny, resigned. The revised edition was developed under the supervision of Mr. William H. Griswold.)

FOREWORD

It is the duty of the public school to serve the community that supports it in any way possible. All too often the school's function is seen as only that of teaching the basic subjects . . . imparting knowledge on a regular basis from nine to three each day.

The public school cannot limit itself only to a student's intellectual growth if it is to do its job well. The school must be concerned with growth in all areas.

The Wilmington Public School System maintains a full-time supervisory staff which is constantly seeking ways to help teachers improve their programs and thus make growth meaningful.

This guide for use by our professional staff personnel in the schools is an excellent example of the range of services the Wilmington Public School System provides for the community.

At present we are not able to offer a city-wide program of remedial physical education but this manual is proof that we are aware of the needs of certain of our students and have moved to satisfy those needs.

The Wilmington Public School System is vitally interested in serving the community and will continue to do all that it can to insure that community needs are identified and steps taken to find solutions for them.

-- Gene A. Geisert
Superintendent of Schools
September 23, 1968

INTRODUCTION

It is recognized that the implementation of a city-wide remedial program in physical education will not be immediately attainable. It is also recognized that the physical education personnel cannot afford to mark time until such a city-wide program is implemented. In order to attempt to partially satisfy the present needs of our students who have need of corrective and remedial physical education work, this guide has been prepared. It is for use of the physical education staff who have had previous technical training either at the college level or through workshops conducted by the department. It is not for use by classroom teachers or for use by physical education teachers who have neither the background nor the inclination to do "corrective" work.

This guide and manual has been prepared so that students with postural and other remedial defects may be assisted in realizing the most from their physical potentials. It is recognized that the regular physical education with its limited time allotment cannot do the job of skill development, safety education, health education and corrective activities. Some additional time must be found for those children with remedial defects, to benefit from the leadership of the schools. This guide is the first step in several which will assist the personnel of the Department of Health, Physical, and Safety Education to provide additional services for our school population. It is not for use in the regularly scheduled Physical Education Classes, but for special use in those schools where principals and teachers have arranged classes for students referred to the schools for postural exercises.

William H. Griswold
Supervisor
Health, Safety, Physical Education
and Athletics

PREFACE

This compilation of exercises in remedial education has been prepared to serve as a reference and guide for teachers working with pupils having postural defects. No attempt has been made to prepare an exhaustive list of the numerous corrective exercises.

Those described have been selected either because of their directed effect on the "over" or "under" toned muscle, or because of skeletal alignment.

The hope is that the attainment of aligned physical balance, the requisite of good posture with the self-discipline used to attain it, will be developed and will lead to greater mental poise and emotional stability. It is believed that knowledge of excellence in appearance through personal effort will have lasting carry-over value.

More complex exercises involving equipment of great variety may eventually be used as a follow-up for corrective activities.

Mary McCloskey
Howard Wise
Co-Chairmen

CORRECTIVE EXERCISES

FOR

POSTURAL DEVIATIONS

ADAPTIVE PHYSICAL EDUCATION

SECTION ONE

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SECTION ONE
ORGANIZATION AND ADMINISTRATION OF REMEDIAL PROGRAM

A SUGGESTED PROCEDURE FOR THE ORGANIZATION AND ADMINISTRATION OF THE ADAPTIVE (REMEDIAL) PHYSICAL EDUCATION PROGRAM WITHIN A SCHOOL.

All instructors should follow a prescribed training guide which outlines the course of instruction.

The guide should describe the exercises in detail.

As the program increases in scope newer methods of instruction and additional exercises should be evaluated.

ORGANIZATION

Good public relations with:

- **Principal and other administrators**

  Plan the program cooperatively.

  Keep the principal informed of progress made.

- **School medical services –**

  Work together to strengthen the program through mutual understanding.

  Visit the infirmary frequently to discuss particular cases.

- **The school staff –**

  Present the details of the remedial program to staff members at a faculty meeting.

  Secure the cooperation of the faculty members in the follow-up of remedial cases by :

  Preparing a list of the enrolled pupils for each advisor.

  Recording the nature of the deviations on the permanent record with a note concerning pupil's progress.

  Posting a list of pupils enrolled on bulletin board in faculty room.

  Interesting the faculty in being "posture conscious".

- **Community –**

  Conduct a program for the P.T.A.

  Submit articles for the newspaper.

  Contact parents and physicians.

  Encourage parents to observe classes.

Essential qualifications of Corrective teacher:

- Exhibit sincere interest and enthusiam for this highly specialized work
- Previous training in corrective therapy
- Informed of current literature
- Ability to devise new remedial exercises or equipment

Remedial physical education room:

- Size – at least as large as regular classroom.
- Location – accessible to gymnasium.
- Lighting and Ventilation – should meet school requirements and regulations.
- Basic Equipment

  Three-way posture mirror

  Plumb line suspended from wall bracket

  Stall bars

Basic Equipment (continued)

Sufficient number of benches or stools to accommodate a class of approximately ten students

Table or plinth

Small mats

Wands

Selection of pupils for classes:

- Pupils selected from the referrals of school physicians.
- Pupil referred to teacher by school nurse or gym teacher.
- Faculty members, parents and physicians may request that a pupil be assigned to the program. The teacher will make an appointment through the school nurse to examine the pupil and complete the necessary referral form.

ADMINISTRATION

Initial pupil-teacher conference

- This conference should be used for indoctrinating pupils:

  Introduce him to the program

  Establish right attitudes

  Acquaint each pupil with his deviation(s)

  Explain the importance of regular practice periods at school and at home

  Impress on him the importance of performing the exercises slowly, vigorously, actively

- Give pupil a letter for parental consent and one for the family doctor for the proper signature.
- Inspect the pupil's roster and tell him when to report for classes.
- Provide time for the pupil to inspect the remedial gym.

Scheduling to the remedial classes

- Pupils should be scheduled for daily classes until marked improvement is shown

  The ideal is to have these classes scheduled in addition to regular physical education classes.

  Although daily classes may be lessened, the work should be continued until "correction" is accomplished or further improvement is declared impossible. The decision should be made by the school doctor.

  The pupil should not be scheduled from the same subject more than one period per week and never scheduled from a one or two period subject.

  Schedule approximately ten pupils for each class.

Evaluation of pupil progress

- Each pupil will be re-examined by school doctor at mid and end of term.
- School physicians will re-examine pupils at irregular times upon teacher's request.
- Evaluation of pupil's progress will be retained by teacher and recorded on pupil's medical report in infirmary.
- A continuous report should be made by teacher and pupil.
- An evaluation should be made on pupil's posture at home.

The Conference Period

- The purpose of the conference is to further the program in general and to insure progress by individual pupils. A few suggestions follows:

  As a definite time for indoctrinating pupils

  As a parent-teacher-pupil conference

  As a teacher-nurse-doctor conference

  As a follow-up period for those pupils who have been dismissed from classes as improved or corrected

  Planning demonstrations or programs, or doing work essential to the program

- The conference period should be held in the remedial room.

Suggestions for conducting the first few class periods:

- FIRST CLASS PERIOD

  Take posture photographs (if possible)

  Take pedographs and explain them

  Test alignment of all pupils with plumb line

  Explain the functioning of the individualized program

  The parent letter must be returned before exercises are taught

- SECOND CLASS PERIOD

  Administer tests for muscle length and strength

  Record finding on planned form and later transfer to a wall chart

  Discuss with each pupil his strengths and weaknesses

  Motivate him to want to better his own record

  Check body alignment before the triple posture mirror

- THIRD CLASS PERIOD

  Check postures before mirror. Correct positions with manual assistance

  Teach approximately two exercises for each deviation in the class. Designate which pupils will practice each particular exercise

  Observe each pupil as he performs his specific exercise(s). Make corrections. Tell him how many repetitions are expected of him and when to increase the number of repetitions.

  Organize classes so that each pupil can assist each other

- FOURTH CLASS PERIOD

  Give 3 or 4 warm-up exercises to entire class, or a simple warm-up game

  Each pupil must be supervised in his practice and corrections made. Always note any improvement.

  Teach an additional exercise to those pupils who are ready for it

In-Service training

- Formal courses provided by Board of Education
- Observations
- Meetings
- Demonstrations
- Visits to orthopedic clinics

Visual education

- Posters
- Films
- Pamphlets

Bibliography (refer to guide)

INFORMATION CONCERNING THE ADMINISTRATION OF ALIGNMENT TESTS AND CORRECTIONS

The skeleton of the human being is composed of segments, which, when in proper balance and relationship with each other, will permit the individual to perform his activities with least strain on the joints and ligaments. These skeletal segments consist of the head, neck, shoulder girdle, thorax, lumbar spine, pelvis, upper extremities, and lower extremities.

Good alignment of these segments is attained when the individual, as a whole, is in balance. The evaluation of postural faults must be made in comparison with a standard, and since posture is mainly a matter of alignment, the standard used is that of skeletal alignment.

The following tests and corrections have proved to be helpful in determining the anteposterior and lateral deviations which are present in those taking individual remedial physical education. Since there are normal differences in body structure, one should not expect every individual to conform, exactly to a set standard. Accordingly, a slight variation should be considered normal. The teacher will find that the three-way mirror and the grid are valuable aids in pointing out the existing deviations and in showing the pupil how he can assume a well-balanced position.

THE PLUMB LINE TEST

Observing the pupil from the side for anteposterior deviations, the plumb line should fall:

- Slightly anterior to the lateral malleolus.
- Slightly anterior to the midline through the knee.
- Approximately through the greater trochanter of the femur.
- Approximately midway between the back and the abdomen.
- Approximately midway between the front and back of the chest.
- Through the shoulder joint. (scapulohumeral articulation).
- Through the ear lobe. (mastoid).

To judge the position accurately, a straight line should be drawn on the floor and the plumb bob suspended directly above it. A small mark should be placed on the foot just anterior to the lateral malleolus. Since the feet are the only stationary part of the body while in the erect position, they must be placed in the correct position before the plumb line test is administered.

Observing the pupil from the back for lateral deviations, the plumb line should fall:

- Midway between the heels.
- Coincide with the gluteal fold.
- Coincide with the spinal column, if it is straight.
- Coincide with the midline of the head.

The pupil should stand with the foot parallel and a few inches apart, with the inner borders of the feet equidistant from a straight line and the plumb bob suspended directly over it.

Observing the pupil from the front for lateral deviations, the plumb line should fall:

- Midway between the feet.
- Coincide with the symphysic pubis
- Coincide with the sternum.
- Coincide with the midline of the head.

The positions of the pupil, the plumb bob, and the line drawn on the floor are the same as for observing the pupil from the back for lateral deviations.

The other tests and techniques are used primarily for motivating purposes. However, the Back Wall Test is widely used in assisting the pupil to decrease the exaggerated lumbar curve.

MANUAL CORRECTION

- If the abdomen is prominent and the shoulders and chest of the pupil are swayed backward, place one hand on his abdomen and the other on his shoulder blades and push gently with both hands until his trunk is aligned better.

- If his hips are too far fowward (anterior pelvic tilt) and his lower back too hollow (lordosis) place one hand on his abdomen and the other on his buttocks, pushing down on his buttocks and upward on his abdomen. Be sure that his knees are not bent.

- If his head is too far forward, place one hand on his abdomen and slide the other arm up the pupil's back so that the palm is behind the head. Ask him to move his head backward until it touches the palm of the hand without tipping his chin upward. The chin should be drawn in.

DOUBLE POLE TEST

- Use two poles, yardsticks or wands. The teacher or assistant holds one pole against the pupil's spine so that the upper end is slightly above level of his neck. Place the other pole along his sternum and center of abdomen with the upper end below the level of his chin. In good posture the poles usually slant forward at the bottom, with his head and chin jutting forward over the top of the front pole. (Upon sliding the front pole upward, it should not touch the nose.)

BACK WALL TEST

- The student stands with his heels two to four inches from the wall, with his buttocks, shoulders and head against the wall. He then slides his hand in the space between the wall and the lumbar spine. The fit is usually quite loose. In an attempt to make it fit more snug he tries to press the lower back against the hand. In doing this he automatically corrects his posture – i.e., he draws in his abdomen, lifts the chest and assumes a better body position. He would attempt to bring his heels to the wall while maintaining the corrected position.

- Then, bringing his body weight away from the wall to a position over the center of his feet, he should walk away in a good alignment.

FRONT WALL TEST

- The student faces the wall and touches his toes against it.

- In good posture the chest touches the wall, but the nose is about an inch from it. To prevent a drawing back of the hips, the hands are placed on

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the front of the thighs, and a depth of the hand, only, must be maintained between the thighs and the wall. To assume this correct position demands the alignment of the body in a correct position.

WHEN ONE SEGMENT OF THE BODY IS OUT OF ALIGNMENT ANOTHER SEGMENT MUST COMPENSATE FOR THAT DEVIATION TO MAINTAIN A BALANCED POSITION.

Correct alignment of the entire body is necessary.

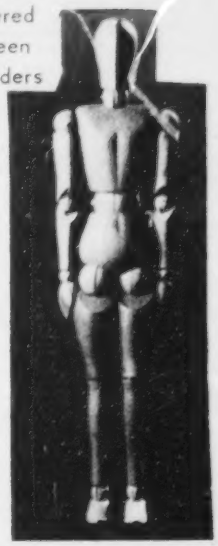
See Figures Below:

Head over Trunk and Centered Between Shoulders

Shoulders Over Pelvis

Pelvis Over Knees

Knees Over Ankles



Shoulders Level

Hips Level

Front View

Crown of Head Extended

Chest Elevated

Abdomen Flat

Shoulders Easy

Pelvic at Forward Tilt

Palms Toward Body

Knees "Easy"

Profile Sketch

Each segment of the body is balanced over the segment below. The balanced posture is maintained habitually in the static position and while the body is in movement.

SECTION TWO

ANTEROPOSTERIOR DEVIATIONS OF THE CERVICAL REGION OF THE SPINE AND BASIC EXERCISES FOR CORRECTION

ANTEROPOSTERIOR DEVIATIONS OF THE CERVICAL REGION OF THE SPINE, AND BASIC EXERCISES FOR CORRECTION

A brief description and common causes of postural defects in the cervical region. The cervical region of the spine affords a greater freedom of movement than either the thoracic or lumbar due to the unique structure of the seven delicate vertebrae.

One of the most common anteposterior deviations of the spine is that of the forward head and neck. Although gravity has a slight tendency to draw the head forward, the posterior extensor muscles of the upper thoracic spine counteract that forward movement if they are of sufficient strength. When the thoracic region of the body is in the correct position, the head is more easily balanced.

Undue fatigue, and weakening or shortening of the neck muscles are among the causes of a forward position of the head and neck. In such a case, the chin is usually tilted upward in an effort to compensate for the strain on the extensor muscles of the thoracic region.

Causes of **general** faulty posture and body mechanics which may affect the cervical region of

- Impaired vision and hearing
- Poor nutrition and fatigue
- Congenital defects
- Defects resulting from injury or illness
- Psychological factors; e.g. inferiority, insecurity, embarrassment
- Muscular weakness
- Occupational factors

REMEDIAL EXERCISES FOR DEVIATIONS OF THE CERVICAL REGION

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EXERCISE I

Objectives

To remove the cause of forward head position
To teach the correct position of the head and neck
To strengthen the muscles of the posterior cervical region
To encourage the pupil to want to maintain correct alignment

Starting position: Correct sitting on a bench with the back against a wall, holding a book with both hands behind the head. The elbows and shoulders must be in contact with the wall, and remain there throughout the exercise.
Move the book forward, resisting this forward motion by contracting the posterior neck muscles and pressing the head backward as the chin is drawn in. The book should not move more than a slight distance from the wall. Relax. Repeat several times slowly.

Common Faults

- Tilting the chin upward and the head backward
- Providing too little resistance, i.e. too little muscular contraction in cervical region

EXERCISE II

Objectives

Same as Exercise I

Starting position: Prone lying with hands on back of the head, elbows on floor. Raise the head, chest, and elbows 3 to 4 inches from the floor, keeping the chin drawn in. The performer does the exercise slowly, at the same time offering resistance by pulling downward on the head with the hands. Relax. Repeat several times.

Common Faults

- Tilting the head backward and the chin upward
- Exerting too little force on the back of the head

EXERCISE III

Objectives

Same as for Exercise I with the addition of correcting entire body alignment

Starting position: Standing with back to wall, touching with buttocks, shoulders and back of head. Heels a few inches from wall. Raise chest, flatten lower back, pull in abdomen and press back of head against wall. Take a few steps from wall. Return. Repeat.

Common Faults

- Loss of body alignment on moving away from wall

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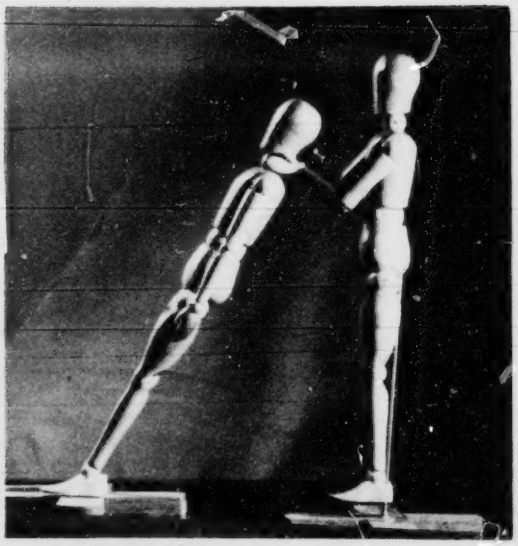
Objectives

Same as for Exercise I



EXERCISE IV

A. Starting position: Standing. Assume correct body alignment. Instructor behind pupil. Places the hands at base of skull. Pupil keeps body rigid as he is lowered backward to 45 degree angle. Pupil maintains rigidity as he is raised to standing position.

B. The same corrective effect may be reached by standing back against wall with feet 18 to 24 inches away. Push body away from wall until only head is in contact.

Common Faults

- Chin and entire trunk not in good alignment
- Body sag

Objectives

To increase the suppleness of the shoulder girdle and the shoulder joint

EXERCISE V

Starting position: The correct aligning position with arms raised forward shoulder high and shoulder width apart. Turn the palms upward while flinging the arms sideward and backward vigorously in a horizontal plane – one, Return – two. Repeat rhythmically and vigorously several times.

Note: The exercise may be done in the standing position when the pupil can maintain the correct position.

Common Faults

- Thrusting the head forward
- Moving the arms below the horizontal plane
- Performing the exercise with insufficient vigor

Objectives

Same as for Exercise III

EXERCISE VI

Starting position: The correct standing position; feet in a side stride stand with the straight arms raised overhead; hands grasping the outer ends of a wall which is held horizontally.

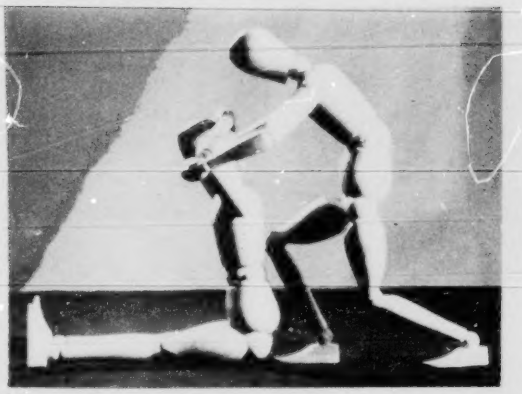
Lower wand slowly downward behind the back to a position near the thighs. An attempt must be made to keep the wand horizontal and the arms as nearly straight as possible throughout the exercise. Repeat several times. Move the hands somewhat closer together as the pupil becomes more supple.

Common Faults

- Incorrect body alignment
- Working too rapidly

Objectives

Same as for Exercise V
Improve suppleness of shoulder girdle



EXERCISE VII

Starting position: Correct sitting position on floor; head erect; hands behind neck. Teacher or assistant stands behind pupil, in a lunge position, with side of right leg, firmly giving support to lower back. Teacher places hands over elbows and grasps. Teacher slowly pulls pupil's elbows upward and backward as pupil assists by contracting the shoulder retractor muscles. Relax. Repeat slowly several times.

Common Faults

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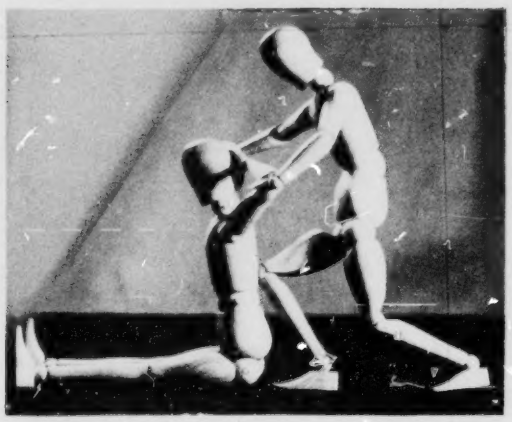
- Tilting the head forward
- Assistant jerking arms backward
- Performing the exercise too fast
- Arching the lumbar spine
- Assistant forcing the arms too far in relation to the suppleness of the pupil's tissue flexibility



EXERCISE VIII

Starting position: Correct standing position with a book balanced on head.

Walk on level for one minute
Walk up and down stairs
Sit – stand from bench
Sit – stand from floor

Objectives

Same as for Exercise III

Common Faults

- Incorrect standing position
- Book slides from position

Objectives

Strengthening, stretching suppleness of shoulder girdle

EXERCISE IX

Stand facing a corner of the room with one hand on each wall, arms at shoulder level, palms forward, elbows bent and abdominal muscles contracted. (A) slowly let the upper part of the trunk lean forward and press the chest into the corner. Inhale as the body leans forward. (B) return to the original position by pushing out with the hand.

EXERCISE X

Stand erect with the arms at the sides. In each hand hold a two pound weight. (A) Shrug the shoulders forward and upward (B) Relax. (C) Shrug the shoulders backward and upward (D) Relax (E) Shrug the shoulders upward (F) Relax and repeat.

EXERCISE XI

Objective

To improve forward head position

Starting position: Seated, reclining, back of head resting on stool. Lift hips from floor – with the use of hands if necessary. Sustain the weight between heels and head for four seconds. Lower hips to floor and rest for eight seconds. Repeat.

Common Faults

- Back arched
- Overstrain – this exercise is most strenous and should be carefully supervised.

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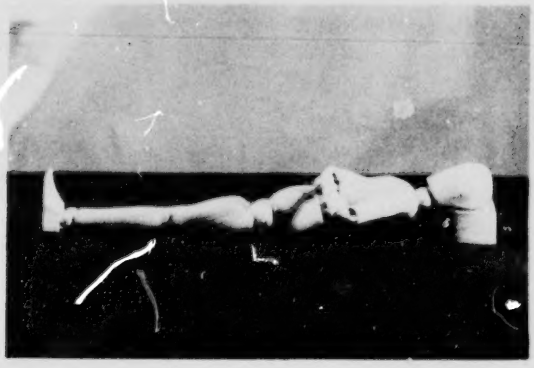
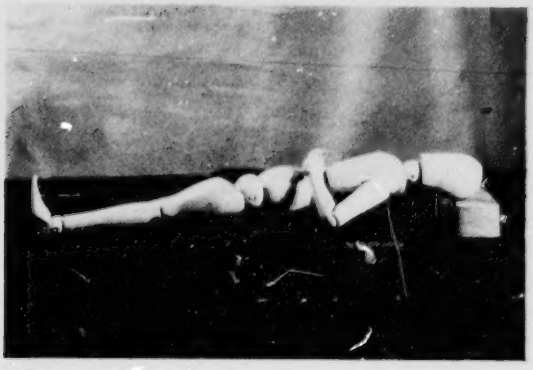
POSITION 1



POSITION 2



SECTION THREE

DEVIATIONS OF DORSAL AND LUMBAR REGIONS OF THE SPINE

DEVIATIONS OF THE DORSAL AND LUMBAR REGIONS OF THE SPINE AND EXERCISES FOR CORRECTION

A brief description and common causes of postural defects in the dorsal and lumbar region.

- ROUND UPPER BACK is a relaxation or flexion of the spine in the thoracic region, with a resultant rounding of the upper back. The physician calls this dorsal kyphosis, in other words a change in the normal curve in a backward direction.

See Figure Below:

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This condition is the typical result of fatigue, malnutrition or poor muscle tone. Tall girls who are conscious of their height and slump down to be less noticeable sometimes develop this condition.

- HOLLOW – BACK is an exaggerated curve in the lower back in a forward direction (lordosis). As a result of this condition the pelvis is usually tilted forward and downward. Abdominal muscles are weakened and stretched, and in compensation the upper body is shifted backward.

See Figure Below:

Hollow back may be either flexible or stiff. The person who habitually stands with his back hollowed and his pelvic tilt increased, but can easily remove the hollow and achieve a good mechanical position, shows what is called a **flexible hollow back.** He can stand well but does not. The person who cannot by himself or under the teacher's attempt at manual correction, assume desirable alignment, shows what is called **stiff hollow back.** He can not stand well. This can be discovered if the teacher will use the following flexibility test:

> The ability to flatten the waistline to the floor when lying in a relaxed position (or almost so) while extending the legs.

In **round hollow back** there appears to be a combination of round upper back and hollow back. The upper and lower curves are about equal. The factors causing both kyphosis and lordosis may be present, or the position may be due to the effort to keep the trunk in good balance when one fault already exists.

See Figure Below:

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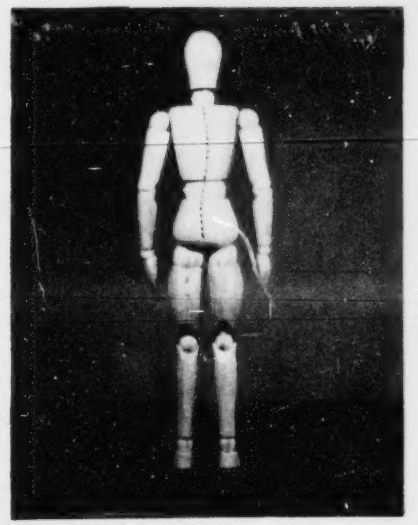
Scoliosis is a lateral curvature of the spine. If the lateral curvature disappears when gravity is no longer influencing the posture, as in lying or when suspended by the hands, it is considered **postural** or **functional** and may be corrected. When lateral deviation has existed for a long period of time, **structural** changes take place in the segments of the spine. The curve will then not disappear on hanging or lying. Severe cases should be referred to a doctor. General causes for faulty spinal alignment are the same as those included in the Cervical Region in Section One.

See Figure Below:



REMEDIAL EXERCISES FOR DEVIATIONS OF THE DORSAL AND LUMBAR REGIONS

EXERCISE I

Objectives

To remove cause of round upper neck
To increase flexibility
To improve upper spinal alignment

Starting position: Sit correctly on a bench with the back and the head against a wall, hands in the lap. The teacher places a ruler on the top of the pupil's head at a right angle to the wall, and places a chalk mark on the wall indicating his usual height.

The pupil extends his spine to its maximum length. The teacher then places a second chalk mark on the wall. A record can be kept of the distance between the two markings.

Common Faults

- Incorrect sitting position
- Failure to repeat after other exercises are given

EXERCISE II

Objectives

To strengthen the shoulder retractor muscles
To encourage the pupil to maintain good body alignment

Starting position: Sit correctly on a bench with the back against a wall; head, shoulders, and buttocks touching the wall; feet parallel and on the floor.

Extend arms overhead against the wall, back of hands against the wall. Bend elbows and move arms downward along wall until hands are opposite head with elbows shoulder high. Hold position for several seconds. Extend arms. Repeat slowly for several times.

Common Faults

- Head thrust forward
- Arching the lumbar spine
- Buttocks sliding from the wall

EXERCISE III

Objectives

Same as for Exercise I

Starting position: Correct sitting position on floor, feet pulled toward body. Teacher stands behind pupil with outside of right leg against spine. Grasp front of pupil's elbows.

Teacher slowly pulls pupils elbows upward and backward as pupil assists by contracting the shoulder retractor muscles. Relax. Repeat slowly several times.

Common Faults

- Forward shifting of head
- Failure to relax
- Loss of correct sitting position

Objectives

Spinal alignment
Shoulder flexibility
Abdominal strengthening

EXERCISE IV

Starting position: Hang on high bar of stall bars. Knees tucked up to chest. Count seconds of endurance for the hang. Rest. Repeat for continued endurance. Knees may be raised and lowered to limit of endurance.

Common Faults

- Hands too close together
- Knees not bent up to full height

Objectives

To improve round upper back and shoulders

EXERCISE V

Starting position: Lying on back, elbows sideward shoulder high, knees bent and feet on floor. Push with elbows against floor until shoulder blades are raised from floor 1 to 2 inches. Relax. Repeat.

Common Faults

- Pushing with head or hollow lower back
- Arms not sideward shoulders height
- Waistline not contacting floor

Objectives

General conditioning
To improve lumbar Kyphosis and flexible lordosis

EXERCISE VI

Starting position: Prone lying on plinth. Slide over end of plinth until trunk is hanging downward at right angle to the floor. Feet and legs must be held in support. Hands clasped behind back.

Extend clasped hands forcefully close to body as trunk is raised to horizontal position. Relax. Repeat.

Common Faults

- Body not hanging from hip joint
- Body raised higher than horizontal

Objectives

To eliminate lumbar curve
To improve contraction in abdominal muscles

EXERCISE VII

Starting position: Standing, trunk hanging toward toes. Grasp legs above ankles, knees slightly bent. Walk ten steps forward without using knee action. Stand. Relax. Repeat moving backward.

Common Faults

- Not moving forward from hips
- Head and spine out of alignment

Objectives

To stretch pectorals
To improve **entire** spine alignment, including mild scoliosis

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EXERCISE VIII

Starting position: Stand on stall bars, soles of feet 3 rungs up from bottom. Hands grasp bar at shoulder level.

Bend knees and squat down as far as possible, return to standing position. Repeat 3 or 4 times, hands grasping a lower bar each time. With the last squat, knees should be touching chest. Stand. Step off. Relax.

Common Faults

- Lack of full downward extension on squat position
- Failure to keep head in correct position
- Standing on arches of feet

Objectives

To balance lateral motion of spine
To strengthen oblique muscles of rib cage and abdomen
To increase flexibility in pelvic girdle

EXERCISE IX

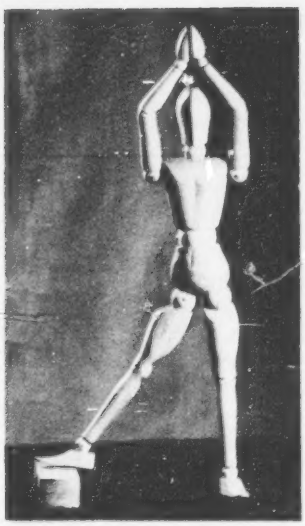
Starting position: Stand with side toward stall bars. Swing near leg sideward to rest on bar at comfortable height.

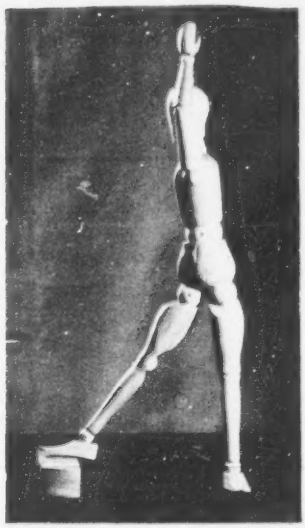
Stretch, arms above head
Twist toward bars
Bend, attempting to touch elevated heel with opposite hand

Repeat the three movements one at a time, **stretching** up, **twisting** away and **bending** toward heel on floor. Repeat exercise to both sides three times or more. Rest. Reverse standing position and elevated leg. Repeat same number of times as for opposite leg.

Common Faults

- Foot on floor not directly opposite elevated foot
- Not relaxed during entire exercise
- Failure to take full stretching position at all times





EXERCISE X

Objectives

Reduce lumbar lordosis
Good spinal alignment
To teach correct pelvic position

Starting position: Lie on floor, entire spine touching, knees bent on floor. Hands behind neck. Elbows held down.

Pull knees to chest. Lower to one side, as close to opposite elbow as possible. Rest. Pull knees over to opposite side. Rest. Return knees to position over chest. Replace feet to floor. Rest. Repeat.

Common Faults

- Waistline not touching floor
- Knees not close to chest
- Performing exercises too rapidly
- Failure to rest between positions

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EXERCISE XI

Objectives

To correct a total "C" curve left, for cases of uncomplicated functional scoliosis
To stretch on the side of the concavity and shorten and strengthen muscles on the side of the convexity

Starting position: Prone lying, right arm upward, left arm at side.

Move right arm in an arch overhead, press down with left hand and slide left hip up. The effect is a reversal of the curve with both stretching and strengthening taking place where needed. Relax. Repeat.

Reverse exercise for total "C" curve right.

Common Faults

- Arching in lower back
- Lack of forceful stretching, lateral trunk movement

EXERCISE XII

Objectives

Same as for Exercise XI

Starting position: Kneeling on right knee, extend left leg side-ward. Right arm is over head, left hand pressed against ribs, fingers to rear.

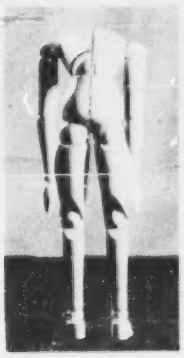
Lateral trunk flexion to left, while the left hand presses against ribs.

Reverse exercise for total "C" curve right.

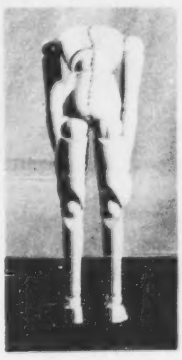
Common Faults

- Same as for exercise XI

ADAM'S POSITION



The spine is straight



There is a lateral curvature

The Adam's Position is used when screening pupils for scoliosis.

The curve will tend to disappear in the Adam's Position if no structural changes have taken place.

Objectives

To reduce kyphosis
Improve spinal alignment

EXERCISE XIII

Hanging from horizontal or stall bars

1. Passive hanging to stretch pectorals and lumbar spine.

2. Active hanging (muscle contracted to hold body weight.) Good for shoulder girdle and spine extensors.

3. Hanging position, back is against upright between section of stall bars, rolled towel or pad between shoulder blades at point of kyphosis.
   Corrective action increased by pressing subject's hips against wall.

Note: This is an effective form of traction. Upward bending of knees, while hanging, is an abdominal strengthener as well as a spinal straightener.

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"C" CURVE
Left Total

"S" CURVE
Left Dorsal - Right Lumbar

SECTION FOUR
DEVIATIONS OF THE LEGS AND FEET

DEVIATIONS OF LEGS AND FEET AND BASIC EXERCISES FOR CORRECTION

A brief description and common causes of leg and feet defects.

- The normal foot is fan-shaped, showing a relatively straight line from the center of the heel to a point on the inner side of the great toe. The arches of the feet are dome shaped in appearance. They are:

  The longitudinal arch, extending along the under portion of the entire foot, from heel to toe. The greater elevation toward the inside of foot.

  The transverse arch, extending from side to side at base of first toe to fifth toe.

- The arch on the inner side of the foot is concave, and on the outer side of the foot is slightly convex. All the toes lie parallel to each other.

- The weight-bearing points in the structure of the foot are carried from the heel through the outer edges of the foot to the ball of the foot. The entire foot is an elastic structure. It articulates with the bones of the leg through the heel.

See Figures Below:

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- Common Causes of Foot Defects

  Incorrect shoes or stockings
  Lack of muscle tone
  Over weight
  Prolonged standing
  Malnutrition
  Foot injury

REMEDIAL EXERCISES FOR DEVIATIONS OF THE LEGS AND FEET

Objectives

To observe the feel of correct position
To increase suppleness of foot and leg muscles
To teach correct position of feet while standing and walking

EXERCISE I

Starting position: Stand before mirror. Feet parallel, few inches apart. Toward mirror walk away and practice correct foot and leg alignment, as well as good posture of the entire body.

Walk approximately 30 feet or more with the heels raised and the toes turned inward. Return.

Walk on the outer borders of the feet for a distance of 30 feet or more and return.

Walk on the toes with heels raised for a distance of 30 feet or more and return.

Walk on the heels with toes raised for a distance of 30 feet or more and return.

Walk a distance of 30 feet or more with toes turned inward and flexed, and return.

Correct walking with the heels slightly striking the floor first.

Walking on the "tilting foot rail."

Common Faults

- Toeing in or out of feet
- Faulty walking gait
- Faulty posture
- Hurrying through exercise

Objectives

Same as for Exercise I

Exercise II

Starting position: Correct sitting position on a bench with the right foot crossed over the left knee. Hold right heel firmly with right hand.

Keeping right heel fixed, circle forepart of foot downward, inward, and upward vigorously. Repeat several times. Repeat with left foot.

Common Faults

- Circling from the ankle joint
- Circling too rapidly

Objectives

Same as for Exercise I

EXERCISE III

Starting position: Correct sitting position on bench, feet parallel and a few inches apart; hands in lap to prevent their assisting during the exercise.

Cross feet, keeping outer borders in contact with floor – one. Stand, keeping feet crossed and weight on outer borders – two. Return to sitting position – three. Repeat slowly several times. Walk forward and backward with feet crossed, weight on outside of each foot.

Common Faults

- Same as for Exercise I

Objectives

Same as for Exercise I

EXERCISE IV

Starting position: Correct sitting position on a bench, feet parallel and a few inches apart. Extend legs, placing both feet forward.

Cross right foot over left at ankle; curl toes and dorsi-flex feet. (Draw toes toward shin). Return. Repeat forcefully several times.

Common Faults

- Same as for Exercise I

Objectives

Same as for Exercise I

EXERCISE V

Starting position: Correct standing position with feet parallel and a few inches apart.

Flex the toes vigorously while raising the inner borders of the feet and rolling the weight to the outer borders. Hold the contracted position for several seconds. Relax. Repeat several times.

Common Faults

- Same as for Exercise I

Objectives

Same as for Exercise I

EXERCISE VI

Starting position: Correct standing position with feet parallel and a few inches apart. Raise heels from floor – one; roll weight to outer borders of feet – two; roll weight back to heels – three; hold – four. The movements from one to four are continuous. Repeat, slowly, several times.

Common Faults

- Same as for Exercise I

EXERCISE VII

Objectives

Same as for Exercise I
To offer resistance
To strengthen and flex toes

Starting position: Correct sitting position on a bench with a large turkish towel spread lengthwise before the feet; the toes and forepart of the feet are on the near edge of the towel; feet are a few inches apart and the toes turned inward.

Keeping the heels stationary, flex the toes while gripping the towel with the toes and the outer borders of the feet and drawing the feet inward and upward (supination). Continue the exercise until enough of the towel has been drawn under the feet to make a **small** heap. Spread the towel and repeat the exercise several times slowly.

Note: A light weight should be placed on the far end of the towel as the muscles become strengthened.

Common Faults

- Using whole foot instead of toes to gather towel

EXERCISE VIII

Objectives

Strengthen ankle and foot arches
To strengthen muscles which move foot in all directions

Starting position: Sitting on bench, marble grasped between toes of one foot.

Cross knees and deposit marble in container, near and at bench height. Relax. Use other foot.

Common Faults

- Poor sitting position

EXERCISE IX

Objectives

Same as for Exercise I and VIII

Starting position: Correct sitting position on bench. Paper on floor at feet. Pencil between toes.

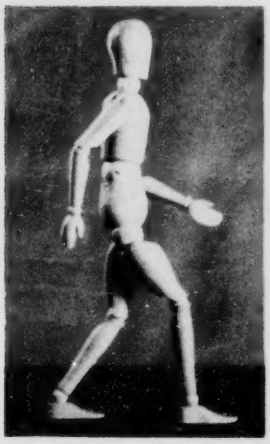
Write name on paper. Alternate feet.

EXERCISE X

Objectives

Same as for Exercise I and VIII

Starting position: Hanging, suspended by hands and feet from horizontal ladder. Separation of 3 or 4 rungs between hands and feet. (1) Count seconds for endurance of hang. (2) Progress along ladder by moving opposite hand and foot. Note progress.



POINTS TO REMEMBER

- When standing or walking toe straight ahead, gently shifting the body weight from heels toward the balls of the feet.

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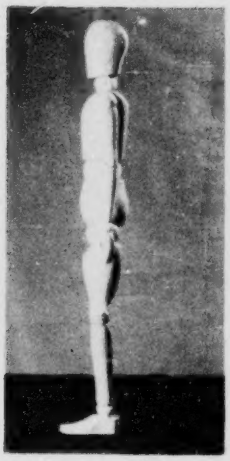
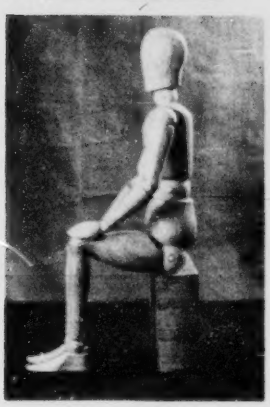
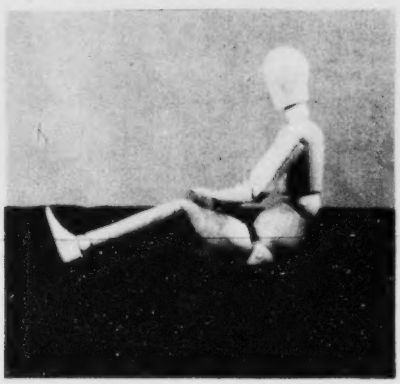


- Keep the head up, chin down, chest up, abdomen in.

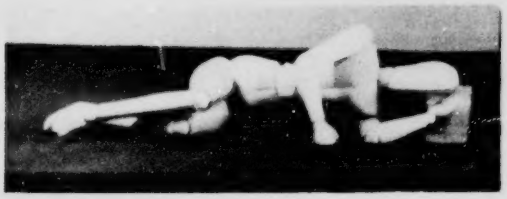


- Sit with the buttocks "tucked under" so that the hollow in the low back tends to flatten.



- When possible, elevate the knees higher than the hips while sitting.

- Sleep on your back with knees propped up, or on your side with one or both knees drawn up. Bed should be firm.



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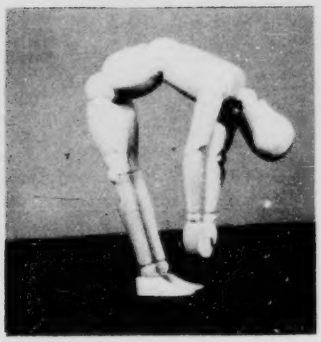
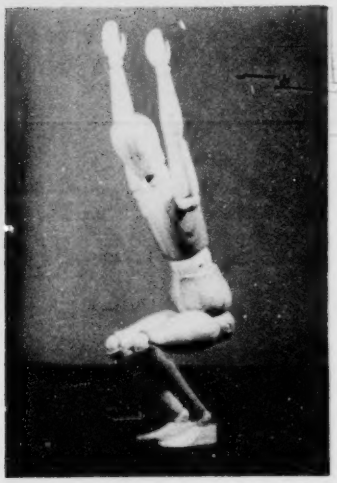
- Bend knees and use legs when lifting a weight. Keep back straight.

- Do not bend forward with knees straight. Always "squat."



- Learn to live 24 hours a day without a hollow in the lower part of your back.



GLOSSARY

ABDUCTION	A movement away from the trunk axis, or the movement away from the mid-line of a body part.
ADAM'S POSITION	The body, is bent forward at the hip joints, feet together, arms relaxed and hanging in front of body. The position is used to determine structural scoliosis.
ADDUCTION	The act of moving a body part toward the body axis. If reference is to the toes or fingers, the movement is toward the mid-line of the foot or hand respectively.
ANKYLOSIS	Extreme stiffness of a joint.
ANTAGONIST	A muscle which acts in opposition to the action of another muscle.
ANTERIOR	Situated in front of or in the forward part.
ANTI-GRAVITY MUSCLES	Muscles (predominantly extensors) which act to maintain the body in an upright position against the force of gravity.
ATROPHY	A wasting away of the tissues of a part or of the entire body.
BARREL CHEST	The thorax is rounded.
BILATERAL	Pertains to both sides; having two sides.
CAVUS	A type of clubfoot.
COCCYX	The small bone at the end of the spine.
COMPRESSION	The act of pressing together.
CONTRACTURE	A shortening or distortion.
DISTAL	Away from point of attachment or origin; opposed to proximal.
DORSAL	Pertains to the back or to any dorsum.
DORSIFLEXION	The act of bending a part backward. When the toes are bent toward the face, they are in dorsiflexion.
DORSUM	The back. The upper or posterior surface, or the back, of any part.
DYSPNEA	Difficult breathing.
EPIPHYSIS	A growing portion of bone separated from the main portion in early life by cartilage, but later becoming part of the larger bone.
EQUINUS	A deformity of the foot in which the individual walks on the toes or the anterior part of one or both feet.
EVERSION	A movement which brings about a twisting or turning outward of the part. The plantar surface of the foot is turned out in eversion of the foot.

EXTENSION	A movement which brings about an increase at the joint angle; a movement which brings the parts of a limb into or toward a straight line.
EXTENSOR	A muscle which serves to extend or straighten a limb or part.
FASCIA	A sheet or band of tissue which encloses and connects the muscles.
FIXATION	The act or operation of holding or fastening in a fixed position.
FIXATION MUSCLES	Provide a firm anchorage support to the origin or insertion points of attachment or immobilize a specific joint or joints.
FLACCID	Lack of tone or tension in a muscle.
FLEXION	The act of bending or condition of being bent.
FLEXOR	A muscle that flexes or bends a joint.
FUNNEL CHEST	A chest in which there is funnel-shaped depression in the middle of the anterior thoracic wall, the deepest part being in the sternum.
GASTROCNEMIUS	The calf muscle which extends the foot at the ankle and flexes the leg.
GENU RECURVATUM	A backward curvature of the knee joint.
GENU VALGUM	A deformity in which the knees are abnormally close together (knock knees).
GENU VARUM	A condition in which the knees are abnormally separated (bowlegs).
GLUTEAL	Pertaining to the muscles forming the buttocks.
HAMSTRING	A tendon of the thigh, back of the knee.
HIP JOINT	The articulation of the innominate bone and the femur.
HYPEREXTENSION	Extreme or excessive extension; extension beyond straight alignment.
HYPERTROPHY	Abnormal overgrowth.
ILIAC CREST	The top ridge of the ilium. There are two prominent processes at the ends of the crest, the one in front being the anterior superior spine, and the one in back being the posterior superior spine.
ILIOFEMORAL LIGAMENT	A part of the capsule of the hip joint, extending diagonally across the hip joint anteriorly from the ilium to the head of the femur.
ILIOPSOAS	The psoas major and iliacus muscles are often referred to as one, the iliopsoas. They flex the trunk on the thigh or the thigh on the trunk.
ILIUM	One of the bones making up the pelvic girdle; the upper portion of the innominate bone.

JOINT	An articulation. A joint is formed by the meeting of 2 or more bones of the skeleton. The articulation at the ankle involves the tibia, fibula, and talus.
KYPHOSIS	An increased posterior curve of the spine which is usually found in the dorsal spine, but which may be present in the lumbar spine.
LATERAL	Is away from the mid-point and toward the outside of the part discussed.
LIGAMENT	Connective tissue tying bones together.
LORDOSIS	An increased anterior curve of the spine, usually found in the lumbar region.
MALLEOLUS	A rounded process on either side of the ankle.
MEDIAL	Pertains to the middle, nearer the median plane.
MEDIAN PLANE	The plane dividing the body longitudinally into symmetrical halves.
METATARSUS	The part of the foot between the tarsus and the toes.
MOBILIZE	To move.
OCCIPITAL	Relative to the back of the head.
OCCIPUT	The back part of the head.
OS CALCIS	The calcaneus or heel bone.
OSTEOCHONDRITIS	Inflammation of a bone and its cartilage.
OSTEOCHONDROSIS	A disease of one or more of the growth or ossification centers.
OSTEOGENESIS IMPERFECTA	A congenital disease marked by fragility of the bones.
OSTEOMYELITIS	Inflammation of the bone.
PELVIC TILT	In a forward (anterior) tilt of the pelvis, there is an increased inclination with the symphysis pubis rotated downward. In a backward (posterior) pelvic tilt, there is a decreased inclination with the symphysis pubis rotated upward.
PELVIS	The basin-shaped ring of bone at the base of the trunk, supporting the spinal column and resting upon the lower extremities. It is composed of the two innominate bones at the side and in front, and the sacrum and coccyx behind.
PIGEON CHEST	A condition of the chest in which the sternum is prominent. It often results from rickets.
PLANTAR	Pertains to the sole of the foot.
PLANTAR FLEXION	The forepart of the foot moves away from the tibia as the ankle is extended.

POTT'S DISEASE	Tuberculosis of the spine.
PRIME MOVERS	Muscles which produce the action.
PROMINENCE	A projection.
PRONATION (foot)	A position of the feet in which most of the body weight is borne on the inner borders of the feet; the ankle falls inward and the forepart of the foot is everted and abducted.
PROXIMAL	Nearest to the center or origin; opposed to distal.
PTOSIS	Prolapse of an organ or part.
ROUND SHOULDERS	A condition of the shoulder girdle in which the scapulae are abducted.
SCAPHOID (navicular)	A bone on the inner side of the tarsus, a tarsal bone in front of the astragalus and behind the cuneiform bone.
SCAPULA	The shoulder blade.
SCOLIOSIS	Abnormal lateral curvature of the vertebral column.
SPINA BIFIDA	A congenital cleft of the vertebral column.
SPRENGLE'S DEFORMITY	Congenital upward placement of the shoulder girdle.
STATIC MUSCLE WORK	The length of the muscle remains the same throughout the contraction. It occurs when a muscle or group of muscles works to hold a given position.
STRETCH REFLEX	A sudden stretch or jerk on a muscle may cause it to contract.
SUBTALOID JOINT	The subastragaloid joint. The articulation between the talus and the os calcis.
SUPINATION	Turning upward.
SUPINE	Lying on the back.
SUSTENTACULUM TALI	A shelf-like bone projecting out from the inner side of the os calcis (calcaneus), on which part of the talus (astragalus) lies.
SYNERGETIC MUSCLES	Muscles which guide the prime movers in performing a movement.
TALIPES CALCANEUS	The foot is tipped up in front and the body weight is carried on the heel.
TALIPES CAVUS	A deformity of the foot in which the plantar arch of the foot is exaggerated due to contraction of the plantar fascia.
TALIPES EQUINUS	A foot deformity in which the person walks on the toes or forefoot. It is due to elevation of the heel by contraction of the Achilles tendon.

TALIPES PLANOVALGUS	Valgus combined with flattening of the plantar arch and of the instep.
TALIPES PLANUS	Flatfoot or splay foot.
TALIPES VALGUS	The individual walks on the inner border of the foot, the sole being turned outward.
TALIPES VARUS	The individual walks on the outer border of the foot, the sole being turned inward. The condition may be due to contracture of the tibialis anterior and posterior muscles or loss of the peroneus longus.
TALUS	The astragalus or ankle bone.
TARSUS	The instep proper with its 7 bones.
TENDON	The fibrous cord of connective tissue by which a muscle attaches to a bone.
THORACIC	The dorsal region of the spine.
TIBIAL TORSION	A twisting of the tibia.
TONUS	A state of partial contraction in a muscle.
TORTICOLLIS	Wryneck; a contracted state of the cervical muscles producing twisting of the neck and an unnatural position of the head.
TUBERCLE	A rough, rounded eminence on a bone.
TUBEROSITY	A protuberance on a bone.
WINGED SCAPULA	A deformity due to paralysis or weakness of the serratus anterior muscle. The middle and lower trapezius muscles may also be weak.
WOLFF'S LAW OF BONE GROWTH	Bone changes its internal architecture and external shape according to the way in which the weight is borne or the stress applied.
WRYNECK	Torticollis.
XIPHOID	The cartilaginous process, shaped like a sword-tip, forming the lower extremity of the sternum.

BIBLIOGRAPHY

Bowen, Wilbur P. and Henry A. Stone. **APPLIED ANATOMY AND KINESIOLOGY. 7th Edition.** Philadelphia: Lee and Febiger, 1953.

Clarke, Henry H. and David H. **DEVELOPMENTAL AND ADAPTED PHYSICAL EDUCATION.** Englewood Cliffs, N.H.: Prentice Hall. 1963.

Colson, John H.C. **POSTURAL AND RELAXATION TRAINING IN PHYSIOTHERAPY AND PHYSICAL EDUCATION.** Illinois: Charles G. Thomas. 1956.

Daniels, Arthur S. **ADAPTED PHYSICAL EDUCATION.** New York: Harper and Bros., 1965.

Daniels, Lucille, Marian Williams and Catherine Worthingham. **MUSCLE TESTING.** Philadelphia: W.B. Saunders Company. 1956.

Davies, Evelyn A. **ELEMENTARY SCHOOL CHILD AND HIS POSTURE PATTERNS.** New York: Appleton, Century, Crofts. 1959.

Dickson, Frank D. and Rex L. Dively. **FUNCTIONAL DISORDERS OF THE FOOT.** 2nd Edition. Philadelphia: J.B. Lippincott Co. 1944.

Kelly, Ellen D. **TEACHING POSTURE AND BODY MECHANICS.** New York: A.S. Barnes Co. 1949.

Kendall, H.O. and Florence P. Kendall. **POSTURE AND PAIN.** Baltimore: Williams and Wilkins Co. 1952.

Kleinberg, Samuel. **SCOLIOSIS.** Baltimore: Williams and Wilkins Co. 1951.

Kraus, Hans. **PRINCIPLES AND PRACTICES OF THERAPEUTIC EXERCISES.** Springfield, Illinois: Charles C. Thomas Co. 1950.

Krusen, Frank H. **PHYSICAL MEDICINE.** Philadelphia: W.B. Saunders Company. 1944.

Lee, Mable and Miriam Wagner. **FUNDAMENTALS OF BODY MECHANICS AND CONDITIONING.** Philadelphia: W.B. Saunders Company. 1949.

Lipovetz, Fred John. **BASIC PHYSIOLOGY OF EXERCISE.** Minneapolis: Burgess Publishing Co. 1954.

Lowman, Charles L. and Carl H. Young. **POSTURAL FITNESS.** Philadelphia: Lee and Febiger. 1960.

McKenzie, R.T. **EXERCISE IN EDUCATION AND MEDICINE.** Philadelphia: W.B. Saunders Company.

Morton, Dudley L. and D.J. Fuller. **HUMAN LOCOMOTION AND BODY FORM.** Baltimore: Williams and Williams Co. 1952.

Phelps, Winthrop M. Robert J.H. Kiputh and Charles W. Goff. **THE DIAGNOSIS AND TREATMENT OF POSTURAL DEFECTS.** Springfield, Illinois: Charles C. Thomas Co. 1956.

Rathbone, Josephine L. **CORRECTIVE PHYSICAL EDUCATION.** Philadelphia: W.B. Saunders Co. 1965.

Scott, Gladys M. **ANALYSIS OF HUMAN MOTION.** New York: Appleton-Century-Crofts. Inc. 1942.

Stafford, George. **CORRECTIVE AND PREVENTATIVE PHYSICAL EDUCATION.** New York: A.S. Barnes Co. 1950.

Stafford, George and Ellen D. Kelly. **PREVENTATIVE AND CORRECTIVE PHYSICAL EDUCATION.** New York: Ronald Press. 1959.

Stone, Eleanor and John Deyton. **CORRECTIVE THERAPY FOR THE HANDICAPPED CHILD.** New York: Prentice-Hall. 1951.

Wells, Katherine F. **POSTURE EXERCISE HANDBOOK.** New York: Ronald Press. 1963.

Williams, Marian and Catherine Worthingham. **THERAPEUTIC EXERCISES FOR BODY ALIGNMENT AND FUNCTION.** Philadelphia: W.B. Saunders Company. 1957.

Woodcock, Beatrice. **SCOLIOSIS.** Stanford University Press. 1946.

CURRICULUM GUIDES

School District of Philadelphia, Division of Physical and Health Education. **PROGRAM IN INDIVIDUAL REMEDIAL PHYSICAL EDUCATION FOR JUNIOR-SENIOR HIGH AND VOCATIONAL TECHNICAL SCHOOLS.**

Los Angeles City Schools. **CORRECTIVE PHYSICAL EDUCATION: TEACHING GUIDE FOR JUNIOR AND SENIOR HIGH SCHOOLS.** Los Angeles: Division of Instructional Services, City Schools. 1958.

Commonwealth of Pennsylvania. **GUIDELINES FOR ADAPTED PHYSICAL EDUCATION.** Harrisburg: Department of Public Instruction. 1965.

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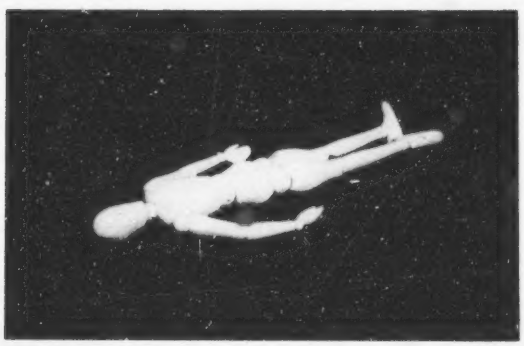

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Mina Thompson